

We claim:

1. A peptide consisting essentially of at least 18 consecutive amino acids of SEQ ID NO:3.
2. The peptide of claim 1, wherein the peptide consists essentially of SEQ ID NO:4, SEQ ID NO:5, SEQ ID NO:6 or SEQ ID NO:7.
3. A fusion peptide comprising the peptide of claim 1 covalently linked to a carrier peptide.
4. The peptide of claim 3, wherein the carrier peptide is maltose binding protein, glutathione-S-transferase, or a six consecutive histidine residues.
5. An isolated nucleic acid sequence encoding the peptide of claim 1.
6. The nucleic acid sequence of claim 5, operably linked to a promoter.
7. A vector comprising the nucleic acid sequence of claim 6.
8. An host cell comprising the vector of claim 7.
9. A method for stimulating the proliferation of a hematopoietic cell in a subject exposed to a chemotherapeutic agent or irradiation comprising
contacting the cell with a peptide comprising at least 18 consecutive amino acids of SEQ ID NO:3, thereby stimulating the proliferation of the hematopoietic cell in the subject.

55

- 50 -

10. The method of claim 9, wherein the hematopoietic cell is a bone marrow cell.
11. The method of claim 9, wherein the hematopoietic cell is a stem cell.
12. The method of claim 9, wherein the hematopoietic cells is a lin^- cell or a CD34^+ cell.
13. The method of claim 9, further comprising contacting the cell with a growth factor.
14. The method of claim 13, wherein the growth factor is stem cell factor, IL-3, IL-6, or flt-3.
15. The method of claim 9, wherein the hematopoietic cell is *in vivo*.
16. The method of claim 9, wherein the hematopoietic cell is *in vitro*.
17. The method of claim 9, wherein the peptide comprises SEQ ID NO:4, SEQ ID NO:5, SEQ ID NO:6 or SEQ ID NO:7.
18. The method of claim 9, wherein the peptide consists essentially of SEQ ID NO:4, SEQ ID NO:5, SEQ ID NO:6 or SEQ ID NO:7.
19. The method of claim 18, wherein the peptide is covalently linked to a carrier peptide.

20. The method of claim 18, wherein the subject is treated with a chemotherapeutic agent, and wherein the chemotherapeutic agent is an agent that cross-links DNA, an antimetabolite that inhibits dihydrofolic acid reductase, an inhibitor of cell cycle progression, or a cell-cycle non-specific interstrand DNA crosslinker.

21. The method of claim 20, wherein the chemotherapeutic agent is mafosfamide, etoposide, cisplatin, methotrexate, cyclophosphamide, a monoclonal antibody, platinum, etoposide, adriamycin, doxorubicin, biCNU, hydroxiurea, taxol, steroids, fluorouracil, viucristine, interferon-alpha, bleomycin, fludarabin, cytokine or a chemokine.

22. A method for stimulating the growth of a hematopoietic stem cell, comprising
contacting the cell with a peptide comprising at least 18 consecutive amino acids of SEQ ID NO:3 and a growth factor, thereby stimulating the proliferation or survival of the hematopoietic cell.

23. The method of claim 22, wherein the hematopoietic cell is a bone marrow cell or a peripheral blood cell.

24. The method of claim 22, wherein the hematopoietic cell is a stem cell.

25. The method of claim 22, wherein the hematopoietic cells is a lin^- cell or a CD34^+ cell.

26. The method of claim 22, wherein the growth factor is stem cell factor, IL-3, IL-6, or flt-3.

27. The method of claim 22, wherein the hematopoietic cell is *in vivo*.

28. The method of claim 22, wherein the hematopoietic cell is *in vitro*.
29. The method of claim 22, wherein the peptide comprises SEQ ID NO:4, SEQ ID NO:5, SEQ ID NO:6 or SEQ ID NO:7.
30. The method of claim 20, wherein the peptide consists essentially of SEQ ID NO:4, SEQ ID NO:5, SEQ ID NO:6 or SEQ ID NO:7.
31. A method of stimulating the proliferation or survival of a hematopoietic stem cell in a subject, comprising
administering to the subject a therapeutically effective amount of a peptide comprising at least 18 consecutive amino acids of SEQ ID NO:3, thereby stimulating the proliferation or survival of the hematopoietic stem cell.
32. The method of claim 31, wherein the hematopoietic cell is a bone marrow cell.
33. The method of claim 31, wherein the hematopoietic cells is a lin- cell or a CD34+ cell.
34. The method of claim 31, wherein the peptide comprises SEQ ID NO:4, SEQ ID NO:5, SEQ ID NO:6 or SEQ ID NO:7.
35. The method of claim 34, wherein the peptide consists essentially of SEQ ID NO:4, SEQ ID NO:5, SEQ ID NO:6 or SEQ ID NO:7.
36. The method of claim 31, wherein the peptide is covalently linked to a carrier peptide.

- 53 -

37. The method of claim ~~36~~, wherein the carrier peptide is maltose binding protein, glutathione-S-transferase, or a series of six consecutive histidine residues.

38. A method of protecting a bone marrow cell in a subject treated with a chemotherapeutic agent or radiation from toxicity caused by chemotherapy or irradiation, comprising administering to the subject a therapeutically effective amount a peptide comprising at least 18 consecutive amino acids of SEQ ID NO:3, thereby stimulating the protecting the bone marrow cell from the toxicity caused by chemotherapy or irradiation.

39. The method of claim ~~38~~, wherein the hematopoietic cell is a bone marrow cell.

40. The method of claim ~~39~~, wherein the bone marrow cell is a hematopoietic stem cell.

41. The method of claim ~~40~~, wherein the hematopoietic stem cell is a lin^- cell or a CD34^+ cell.

42. The method of claim 38, wherein the peptide comprises SEQ ID NO:4, SEQ ID NO:5, SEQ ID NO:6 or SEQ ID NO:7.

43. The method of claim 38, wherein the peptide consists essentially of SEQ ID NO:4, SEQ ID NO:5, SEQ ID NO:6 or SEQ ID NO:7.

44. The method of claim ~~42~~, wherein the peptide is covalently linked to a carrier peptide.

56

- 54 -

7 ~~45~~. The method of claim 44⁶, wherein the carrier peptide is maltose binding protein, glutathione-S-transferase, or a series of six consecutive histidine residues.

8 ~~46~~. The method of claim 38¹, wherein the subject is treated with a chemotherapeutic agent, and wherein the chemotherapeutic agent is an agent that cross-links DNA, an antimetabolite that inhibits dihydrofolic acid reductase, an inhibitor of cell cycle progression, or a cell-cycle non-specific interstrand DNA crosslinker

9 ~~47~~. The method of claim 46⁸, wherein the chemotherapeutic agent is mafosfamide, etoposide, cisplatin, methotrexate, cyclophosphamide, a monoclonal antibody, platinum, etoposide, adriamycin, doxorubicin, biCNU, hydroxiurea, taxol, steroids, fluorouracil, viucristine, interferon-alpha, bleomycin, fludarabine, cytokine or a chemokine.

48. A method of protecting a bone marrow cell in a subject treated with a chemotherapeutic agent or radiation from toxicity caused by chemotherapy or irradiation, comprising administering to the subject a therapeutically effective amount of a nucleic acid encoding a peptide comprising at least 18 consecutive amino acids of SEQ ID NO:3, thereby stimulating the protecting the bone marrow cell from the toxicity caused by chemotherapy or irradiation.

49. A method of stimulating hematopoiesis in a subject with a disorder that impairs hematopoiesis, comprising administering to the subject a therapeutically effective amount of a peptide comprising at least 18 consecutive amino acids of SEQ ID NO:3, thereby treating the disorder that impairs hematopoiesis.

57